

that he can assist Mr. Bleitz should send information to him at 1001 N. McCadden Place, Los Angeles 38, California.

The National Science Foundation has appointed Dr. Walter Hendricks Hodge as Program Director for Systematic Biology in the Foundation's Division of Biological and Medical Sciences. Before coming to the Foundation, Dr. Hodge was Head of the Department of Education and Research of the Longwood Gardens, Kennett Square, Pa. At that time, he also served as special consultant to NSF for tropical biology.

Mr. J. C. Finlay of 6710-102 A Avenue, Edmonton, Alberta, Canada, is studying the Purple Martin (*Progne subis*) and its movements throughout the continent. He plans an extensive banding program this year and is interested in corresponding with others having a similar interest or having knowledge of any aspect of the biology of this species.

The Ring is an international, quarterly bulletin devoted mainly to bird banding and migration studies. It contains a comprehensive section on recent literature, and it has been adopted by the International Committee for Bird Banding as the medium of publication for all official recommendations and announcements of the Committee.

Editorial offices are at the Laboratory of Ornithology, Sienkiewicza 21, Wroclaw, Poland. *The Ring* may be obtained for \$1.50 per year from European Publishers Representatives, Inc., Times Building, 1475 Broadway, New York 36, New York.

Dr. Philip S. Humphrey has been appointed Curator of Birds at the United States National Museum and will assume the position beginning 1 June 1962.

LETTER TO THE EDITOR

One or two comments about the article, "Kermadec Petrel in Pennsylvania" by Donald S. Heintzelman in the *Wilson Bulletin* for September 1961 seem in order. The observation upon which this article is based was discussed by Mr. Heintzelman and others in three numbers of the *Linnaean News-Letter* in 1959 and 1960. In the issue of that publication for January 1960, vol. 13, no. 7, Mr. Eugene Eisenmann listed a number of reasons why many will consider this record doubtful. He also pointed out that the only previous record of this South Pacific species in the Atlantic, a specimen reportedly picked up in England on April Fool's Day, 1908, has been rejected by Bannerman (1959. *Birds of the British Isles*, vol. 8, pp. 150-153).

Some observers who saw the bird at Hawk Mountain and subsequently examined both photographs and skins were not satisfied that the bird was *Pterodroma neglecta* and thought it more like *Pterodroma arminjoniana* of the Atlantic. Most of these considerations were known to Mr. Heintzelman who discussed Eisenmann's comments in the same issue of the *Linnaean News-Letter*. One would have expected some mention of them in the article thereafter submitted to the *Wilson Bulletin*.

Sincerely yours,
DEAN AMADON

LETTER TO THE EDITOR

Mr. Ted T. Allen's "Notes on the Breeding Behavior of the Anhinga" (1961. *Wilson Bull.*, 73:115-124) elicits my comment with respect to certain aspects of the external features as well as of the behavior of breeding Anhingas which he either did not call attention to or, in some cases, noted that he did not observe. It is important that assumption not be made that these do not exist or may not occur. My comments are in no way intended as deprecative of Mr. Allen's interesting reporting.

In considering external features of breeding Anhingas, certain modifications were incompletely diagnosed. First, birds with yellow lores are, from my experience, those which have not yet reached the zenith of sexual development or have passed beyond it. Males and females which I have collected and those which I have observed during the breeding cycle developed lores uniform in color with the bluish bare skin about the eye. This uniformity of coloration develops shortly before actual pairing; it persists into early or middle stages of incubation. Courtship behavior, of course, may begin before the blue lores are attained (see beyond). Second, although mention is made of the female developing a black mark "beginning on the rictus and extending down into the gular sac," no mention is made of the entire gular area becoming black in both sexes at full-breeding. This is of significance during behavior characterized by presentation of the open mouth to the opposite bird. Such display, elements of which I describe beyond, may not have been entirely appreciated by the observer. Third, the female, as well as the male, develops light-colored feathers on the head and neck (see, e.g., Sharpe. 1898. *Cat. Birds Brit. Mus.*, 26:421) and erection of these also figures prominently in courtship. Fourth, in enumerating visual stimuli involved in courtship, no mention is made of the tail. After prenuptial molt the rectrices have a grayish-white terminal band which contrasts sharply with the remaining black portion of the feather. In post-breeding birds this band is largely, sometimes entirely lost through wear. Significance of the elevation and spreading of the tail during courtship behavior cannot be fully appreciated unless this pronounced color contrast is taken into consideration. It may be added that after the prenuptial molt the central pair of rectrices displays flutings or corrugations which are far more obvious than those of post-breeding birds in which the flutings are becoming shallower, those of the distal ends of the rectrices becoming so shallow as to be scarcely discernible. Owre (1959. Unpub. Ph.D. dissertation, Univ. Mich.: 121) points out that these flutings cause reflections of light which contrast with the black feather background and that such contrasts may also be functional in display (flutings of the scapulars no doubt have similar significance).

Allen found that Anhingas began concentrating at Lake Alice in late March and that pairing, which occurred "rather rapidly," was preceded by "rapid initiation of display behavior." One may assume that the main portion of this population must have been elsewhere prior to breeding. I have observed behavior of Anhingas in wintering assemblages that is of significance with respect to the sudden initiation of display noted in the Lake Alice birds. As winter progresses in south Florida, water levels in the Everglades and cypress swamps usually drop considerably. At these times Anhingas either move to the coastal mangrove swamps or concentrate about canals, cypress runs, ponds, etc., which afford sufficient water for fishing. Through the course of one winter I kept under regular observation a group of Anhingas gathered at a cypress run in Collier County. No birds eventually nested in that immediate area. Indications of awakening sexual interest were first seen in birds which began plucking at twigs and vegetation. Such were often carried about for a few seconds and then dropped. Later, cypress and willow branchlets, bare or

foliated, clumps of epiphytic orchids, Spanish moss, etc., were seized and vigorously wrestled with, such efforts becoming increasingly persevering. Loose pieces might now be carried about for several minutes, juggled, and sometimes tossed into the air and caught, much as fish are prior to swallowing. At approximately this stage of behavior advances toward birds of the opposite sex became obvious. The male was usually the advancing bird, and he often carried with him, sometimes interrupting an advance to secure, twigs or branches. At first, advances were seemingly haphazard and rarely of long duration. As a bird drew near, the other would move away or fly, occasionally pausing to spar briefly with the advancer. Sparrings between two individuals became increasingly common. Sometimes birds moving along different levels of the large cypress boughs would spar vigorously at those of the opposite sex, the latter often being taken by surprise. With the increasing frequency of advances and sparrings, the usual *arr*, *arr*, *arr*-call quickened in tempo and became of greater range of scale, often stimulating a wave of calling by neighboring birds. As changes in the color of the bare skin of the head developed, the birds left the assemblage, those in advanced stage of color change apparently not remaining for any length of time. By mid-February the group had dwindled from an estimated 70 or more present in early January to only an occasional immature or obviously non-breeding bird. Thus it is clear that early courtship behavior does not necessarily begin at the actual nesting site. In fact, Meanley (1954. *Wilson Bull.*, 66:83) suggested that pairing might have occurred before some of the Anhingas reached the Swan Lake, Arkansas, colony upon which he reported.

Allen noted that "completed nests appeared to be lined copiously with leafy willow twigs which show against the rim," yet he failed to note that the Lake Alice breeding birds exhibited any particular ceremony or otherwise noteworthy behavior involved in nest-relief. Those breeding birds I have observed added fresh vegetation to the nest throughout the period of incubation. (Nests with only dried, brown leaves showing are thus easily recognized as in disuse.) Incubating birds may spend considerable time breaking off branches which are within reach of the sitting bird. Without shifting positions the birds place these about the inside and along the rim of the nest, always more or less anterior to the position of the bird's breast. I frequently observed Anhingas pause and break off foliated twigs from the nesting tree itself as they climbed toward the incubating partner. I have observed them carrying branches while they were in flight to the nest. Presentation of this material to the incubating bird figures prominently in ceremonies of greeting, copulation, and incubation-relief. A typical passage from my field notes is illustrative: "♂ surfaces under nest tree with a small branch in mouth; he dives and resurfaces with only aquatic plants. ♂ begins climbing upward in willow [to the nest five feet above]. As ♂ climbs, incubating ♀, neck arched, head pointed down, mandibles agape, and calling loudly and continuously, shakes her head vigorously from side to side. ♀ seizes material from mandibles of ♂ as his head reaches the nest rim. ♂ now, mandibles agape, head moving vigorously, calls loudly for several seconds. ♀ positions material into nest. ♂ hops to exposed limb three feet away and begins to sun." In this instance the male broke off a willow branch and presented it to the female when he relieved her of incubation some time later.

Allen's observations were made at a distance from the rookery and he was unable to detect vocalizations of the nesting adults. At nesting both sexes emit loud, excited calls which I have heard at no other season. These are exchanged as a bird approaches its incubating partner and during ceremonies at the nest. My notes describe the calls as squealing-raucus, rapidly uttered series of *chitter*, *chitter*, *chitter*, *chee*, *cheur*, *chitter*, *chitter*, often rising, then falling as they are uttered. Since these calls are so loud and

characteristic and, since they are confined to the immediate vicinity of the nest, one can chart the directions from which the calls emanate over a period of time and gain a rather good idea of the number of nests in an area as well as the general location of them.

I have observed that these calls are accompanied by characteristic motions of the head. Allen reports that the female at pair formation opens her bill, vibrates her throat, and makes sweeping motions with her head. I have found it characteristic of birds at the nest that the head is drawn up and back, the neck arched, and the mouth opened, displaying its black interior as it is swayed about. As calling is terminated, the open mandibles may be thrust downward toward the nest, sometimes shoved repeatedly into the nest material itself. This I have observed in birds of both sexes.

Composition of soaring groups and the distances and positions from which these must be observed render it difficult, as Allen found, to attach sexual significance to soaring. (It is not unlikely, however, that the spread-winged attitudes of perched birds may afford important visual clues to flying birds during the period of courtship and nesting as well as at other seasons.) Allen noted no courtship behavior by birds in either soaring or, apparently, non-soaring flight. On 7 November 1953, I watched for approximately 20 minutes a male and female Anhinga in flight. During the first 15 minutes they were flying within approximately 100 feet of each other and moving, alternately flapping and gliding, in a wide circle approximately a mile in diameter. A strong wind was blowing and advantage was obviously being taken of obstruction currents rising from the irregular terrain. In unison they would ascend to possibly 400 feet in altitude, then glide back down to almost tree-top level. During the last few minutes they proceeded in a straight line along the road I was on, utilizing air currents rising from its embankments. The female kept the lead during much of this flight. Flapping vigorously, the male would overtake to a point usually directly below, sometimes directly above her. Both would then glide briefly, craning heads about as they appeared to gaze at each other. They continued in this manner for approximately a mile, the male finally circling apart. This may well have been a display flight (the early date notwithstanding since Anhingas are known to breed sparingly in south Florida in fall and winter). Although Bent (1922. *U.S. Nat. Mus. Bull.*, 121:230) speaks of Anhingas courting on the wing, the only actual description I know of in the literature is that of Audubon's (1838. *Ornith. Biog.* 4.).

I should point out that my comments are based upon observations made in south Florida, ecological factors of which differ from those at Lake Alice. Furthermore, my observations of breeding birds have been from relatively small groups of only Anhingas, not from the large assemblages of mixed species of which Allen reported.

Very truly yours,
OSCAR T. OWRE